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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/597,232	11/28/2007	Willibald Konrath	4015-5830 / P/63968/GPTU6	8059
24112 7590 11/10/2009 COATS & BENNETT, PLLC 1400 Crescent Green, Suite 300 Cary, NC 27518			EXAMINER LEE, JAEYUN	
			ART UNIT 1791	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/597,232	<b>Applicant(s)</b> KONRATH ET AL.	
	<b>Examiner</b> JAEYUN LEE	<b>Art Unit</b> 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 January 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 10-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/17/2006 and 10/24/2006</u> .                                | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Priority***

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Germany on 1/16/2004 on. It is noted, however, that applicant has not filed a certified copy of the 102004002274.7 application as required by 35 U.S.C. 119(b).

### ***Claim Objections***

2. Claim 18 is objected to because of the following informalities: Claim 18 is depended on claim 1 wherein claim 1 is cancelled. Appropriate correction is required. For the purpose of claim, the examiner interprets claim 18 being depended on claim 10.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 10 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 12 recites the limitation "the line" and "the first adhesive dot" in claim 12, line 1. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is needed.

For the purpose of claim, the examiner interprets claim 12 as the method of claim 11 wherein the line along which a first fore-running adhesive dot is placed comprises a central longitudinal axis of the contact area.

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***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 10- 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over YOSHIDA et al. (US 5,187,123) in view of KUNZ (US 4,803,124) and HASSALL et al. (US 5,942,062).

**With respect to claim 10**, YOSHIDA et al. disclose a method of gluing a circuit component (semiconductor chips) to a circuit board (a lead frame) comprising (title;abstract): placing a plurality of adhesive dots (plural adhesive spots; title) in a regular pattern in the contact area between the circuit component and the circuit board; contacting the circuit component and the circuit board (column 1, lines 10-17; figures 10A-10P).

However, it is silent as to the method comprising placing one or more fore-running adhesive dots in the contact area and not in alignment with the regular pattern

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of adhesive dots; and the fore-running adhesive dots merge with the regular patterned adhesive dots when contacting the circuit component and the circuit board.

It is known in bonding semiconductor chips to a mounting surface utilizing adhesive applied in starfish patterns art (title; KUNZ) that a group of five hypodermic needles coupled to a dispensing pump serve to dispense a number of spaced droplets of a die attach adhesive material onto a support surface for contact with bonding surface of a semiconductor chip is well known technique for bonding of semiconductor chips to a mounting surface. However, when the chip is pressed against the droplet, each droplets expands as indicated in phantom lines in figure 1B so as to leave gaps between each adhesive drop.

It has been observed that an optimum bond should be substantially fully and uniformly spread between the chip and its mounting surface and be free of voids in the die attach adhesive material by a method wherein forming means serves to form the deposit dispensed from opening 33 into the general shape of a starfish as shown in Fig. 3 as deposit 21. Thus the shape of the deposit generally includes a raised central portion disposed at the intersection of the radially inner ends of a plurality of arms 26 increasingly thickened progressively radially inwardly thereof. Arms 26 extend from the raised central portion of deposit 21 to cause deposit 21 to spread symmetrically and with uniform thickness across the mounting surface 27 when compressed by the planar bonding surface of the semiconductor chip applied thereto. Deposit 21 accordingly becomes substantially coextensive with the bonding surface of the chip when so spread therebeneath (column 1, lines 8-25; column 4, lines 40-51; figures 1A-1, 2, and 3).

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Also, it is known in pattern to control spread of adhesive during lamination of sheets art (title; HASSALL et al.) that sheet 32 is provide with a pattern comprising quadrangular adhesive domains 34 oriented with their diagonals 36 substantially parallel to direction of lamination 16 and adhesive-free lanes 38 between domains 34. A connecting domain 35 is provided at the leading edge 40 of the pattern on sheet 32. Lamination of sheet 32 to a second sheet begins at leading edge 40 and progresses to trailing edge 42. Because the adhesive-free lanes are at substantially 45 degrees to direction of lamination 16, air between domains 34 is expelled during lamination along left and right edges 44 and 46 of sheet 32, as well as along trailing edge 42 (figure 5; column 7, lines 19-27)

Although a greater amount of adhesives are provided in the central portion of the deposit (raised portion of the deposit) via a starfish shape die as taught by KUNZ (deposit), one skilled in the art would have readily appreciated to recognize that by applying one or more additional adhesive dots around the central adhesive dot of regular patterned adhesive dots of YOSHIDA et al. would also provide the greater amount of adhesives in the central portion of the contact area of YOSHIDA et al.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the central adhesive dot of regular patterned adhesive dots of YOSHIDA et al. with one or more additional adhesive dots (one or more fore-running adhesive dots) around the central adhesive dot (of YOSHIDA et al.) as taught by KUNZ as modified by KUNZ to provide greater amount of adhesives in the central portion of the deposit to cause the central portion of contact area to spread out

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without leaving the air between the regular patterned adhesive dots as evidenced by HASSALL et al.

**With respect to claim 11**, YOSHIDA et al. as modified by KUNZ and HASSALL et al. disclose the method as discussed above respect to claim 10. However, it is silent as to the method wherein at least two additional adhesive dots (one or more fore-running adhesive dots) are placed along a line.

Note here that one skilled in the art would have readily appreciated to employ more than one additional adhesive dots around the central adhesive dot of regular patterned adhesive dots of YOSHIDA et al. as modified by KUNZ and HASSALL et al. to provide efficient amount of adhesive in the central portion of the contact area in order to reduce the chance of leaving the air gap between the regular patterned adhesive dots.

**With respect to claim 12**, YOSHIDA et al. as modified by KUNZ and HASSALL et al. disclose the method as discussed above respect to claims 10 and 11. However, it is silent as to the method wherein a line along which a first fore-running dot is placed comprises a central longitudinal axis of the contact area.

Note here that one skilled in the art would have readily appreciated to recognize that first additional adhesive dot could be placed in any area around the central adhesive dot of regular patterned adhesive dots of YOSHIDA et al. as modified by KUNZ and HASSALL et al. as long as the greater amount of adhesive is provided in the central portion of the contact area.

Therefore, it would have been obvious to one of ordinary skill in the art to apply a first additional adhesive dot (a first fore-running adhesive dot) in a central longitudinal axis of the contact area as one's one of possible place to apply a first additional adhesive dot around the central adhesive dot of regular patterned adhesive dots to ensure that the central adhesive dot is provided with greater amount of adhesives.

**With respect to claim 13**, YOSHIDA et al. as modified by KUNZ and HASSALL et al. disclose the method wherein the regular patten comprises rows and columns. However, it is silent as to the method wherein one fore-running adhesive dot is aligned with a central column of regular pattered adhesive dots.

Note here that one skilled in the art would have readily appreciated to recognize that an additional adhesive dot could be placed in any area around the central adhesive dot of regular patterned adhesive dots of YOSHIDA et al. as modified by KUNZ and HASSALL et al. as long as the greater amount of adhesive is provided in the central portion of the contact area.

Therefore, it would have been obvious to one of ordinary skill in the art to apply an additional adhesive dot (a fore-running adhesive dot) being aligned with a central column of regular patterned adhesive dots as one's one of possible place to apply an additional adhesive dot around the central adhesive dot of regular patterned adhesive dots to ensure that the central adhesive dot is provided with greater amount of adhesives.

**With respect to claim 14**, YOSHIDA et al. as modified by KUNZ and HASSALL et al. disclose the method wherein one or more fore-running adhesive dots are



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staggered between columns of regular patterned adhesive dots (one or more additional adhesive dots being placed around the central adhesive dot of regular patterned dot provide as staggered one or more additional adhesive dots between columns of regular patterned adhesive dots).

**With respect to claim 15**, YOSHIDA et al. as modified by KUNZ and HASSALL et al. disclose the method wherein, upon contacting the circuit component and the circuit board, one or more fore-running adhesive dots merge with one or more regular patterned adhesive dots prior to regular patterned adhesive dots merging with other regular patterned adhesive dots.

Note here that since one or more additional adhesive dots are applied (the greater amount of adhesive being applied) to around the central adhesive dot of regular patterned adhesive dots as taught by YOSHIDA et al. as modified by KUNZ and HASSALL et al., it would have been obvious to one of ordinary skill in the art to recognize that one or more additional adhesive dots around the central adhesive dot (regular pattern adhesive dot) to be merged with one or more regular patterned dots prior to regular patterned adhesive dots merging with other regular patterned adhesive dots.

**With respect to claim 16**, YOSHIDA et al. as modified by KUNZ and HASSALL et al. disclose the method wherein the adhesive of the merged fore-running adhesive dots and regular patterned adhesive dots displaces air through the interstitial spaces of non merged regular patterned adhesive dots to prevent trapped air pockets between the circuit component and the circuit board.

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**With respect to claim 17**, YOSHIDA et al. as modified by KUNZ and HASSALL et al. disclose the method as discussed above respect to claim 10. However, it is silent as to the method wherein the one or more fore-running adhesive dots are placed in the contact area before any regular patterned adhesive dots are placed in the contact area.

Note here that one skilled in the art would have readily appreciated to recognize that the additional adhesive dots could be placed in any time as long as the greater amount of adhesives are provided in the central portion of the contact area.

Therefore, it would have been obvious to one of ordinary skill in the art to apply one or more additional adhesive dots (one or more fore-running adhesive dots) being placed in the contact area before any regular patterned adhesive dots are placed in the contact area as one's one of desired time (before or after) to apply one or more additional adhesive dots around the central adhesive dot of regular patterned adhesive dots to ensure that the greater amount of adhesives are provided in the central portion of the contact area.

**With respect to claim 18**, YOSHIDA et al. as modified by KUNZ and HASSALL et al. disclose the method as discussed above respect to claim 10. However, it is silent as to the method wherein the total amount of adhesive in the fore-running adhesive dots are less than about 10% of the total amount of adhesive in the regular patterned adhesive dots

Note here that one skilled in the art would have readily appreciated to recognize that total amount of additional adhesive dots could be any amount as long as the

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greater amount of additional adhesives are provided in the central portion of the contact area.

Therefore, it would have been obvious to one of ordinary skill in the art to employ the total amount of additional adhesive dots to be less than about 10% of total amount of regular patterned adhesive dots as one's desired optimum amount to be applied to the contact area to ensure that the greater amount of adhesives are provided in the central portion of the contact area.

**With respect to claim 19**, YOSHIDA et al. as modified by KUNZ and HASSALL et al. disclose the method as discussed above respect to claim 10. However, it is silent as to the method wherein at least one fore-running adhesive dot comprises more adhesive than any regular patterned adhesive dot.

Note here that one skilled in the art would have readily appreciated to recognize that the amount of at least one additional adhesive dot could be any amount as long as the greater amount of additional adhesives are provided in the central portion of the contact area.

Therefore, it would have been obvious to one of ordinary skill in the art to employ at least one additional adhesive dot with more adhesive than any regular patterned adhesive dot as one's desired optimum amount of additional adhesive dot to be applied to the contact area to ensure that the greater amount of adhesives are provided in the central portion of the contact area.

**With respect to claim 20**, YOSHIDA et al. as modified by KUNZ and HASSALL et al. disclose the method further comprising placing a corner adhesive dot adjacent a corner of the contact area.

Note here that HASSALL et al. disclose a connecting domain 35 is provided at the leading edge 40 of the pattern on sheet 32.

Therefore, it would have been obvious to one of ordinary skill in the art to employ the additional dot of YOSHIDA et al. as modified by KUNZ and HASSALL et al. with a additional adhesive dot being placed in the corner of the contact area so that the greater amount of adhesives are in the corner portion of the contact area to provide more complete coverage of the contact area with the adhesives during bonding process.

**With respect to claims 21-22**, Although YOSHIDA et al. as modified by KUNZ and HASSALL et al. disclose the method further comprising placing a corner adhesive dot adjacent a corner of the contact area, it is silent as to placing the corner additional adhesive dot on a bisectrix of the corner of the contact area; wherein the distance between the corner adhesive dot and an adjacent edge of the contact area is less than the distance between any regular patterned adhesive dot and the adjacent edge of the contact area.

Note here that one skilled in the art would have readily appreciated to recognize that the corner additional adhesive dot could applied in any place as long as the complete coverage of the contact area is achieved.

Therefore, it would have been obvious to one of ordinary skill in the art to employ the corner additional adhesive to be placed on a bisectrix of the corner of the contact

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area as one's desired optimum location of corner adhesive dot to be applied to the corner of contact area to ensure that the complete coverage of contact area is achieved (including the corner of the contact area) and such would provide the distance between the corner additional adhesive dot and an adjacent edge of the contact area is less than the distance between any regular patterned adhesive dot and the adjacent edge of the contact area.

**With respect to claims 23-24**, YOSHIDA et al. as modified by KUNZ and HASSALL et al. disclose the method as discussed above respect to claim 10. However, it is silent as to the total amount of adhesive in the regular patterned adhesive dots generates an adhesive layer between about 2 micrometer and about 10 micrometer after contacting the circuit component and the circuit board; wherein the adhesive layer is about 5 micrometer.

Note here that one skilled in the art would have readily appreciated to recognize that the thickness of adhesive layer after bonding is depended on the application used by the user.

Therefore, it would have been obvious to one of ordinary skill in the art to employ the adhesive layer thickness of YOSHIDA et al. as modified by KUNZ and HASSALL et al. with 5 micrometer thick as one's desired optimum thickness.

**With respect to claim 25**, YOSHIDA et al. as modified by KUNZ and HASSALL et al. disclose the method wherein the adhesive comprises an epoxy resin that includes metal particles (...a lead frame is coated with an adhesive paste such as silver epoxy paste...; YOSHIDA et al.; column 1, lines 14-16).

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**With respect to claim 26**, YOSHIDA et al. as modified by KUNZ and HASSALL et al. disclose the method wherein placing adhesive dots comprises flowing adhesive through nozzle (nozzle apparatus 1; YOSHIDA et al.; Figure 1).

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAEYUN LEE whose telephone number is (571)270-5114. The examiner can normally be reached on Monday thru Friday 8am to 5pm est..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on 571-272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeff Aftergut/  
Primary Examiner, Art Unit 1791

/JL/  
10/29/2009